

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): A film formation method for forming a metal nitride film having a predetermined thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen-containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal compound gas and supply the nitrogen-containing reducing gas,

wherein, in film formation, the target substrate is set at a temperature of less than 450°C, the process container is set to have therein a total pressure of more than 100 Pa, and the nitrogen-containing reducing gas is set to have a partial pressure of 30 Pa or less within the process container in the first step.

Claim 2 (Original): The film formation method according to claim 1, wherein a film thickness obtained by the cycle performed once is set to be 0.50 nm or less.

Claim 3 (Original): The film formation method according to claim 1, wherein, in the first step, the nitrogen-containing reducing gas is set to have a partial pressure of 20 Pa or less within the process container.

Claim 4 (Original): The film formation method according to claim 3, wherein a film thickness obtained by the cycle performed once is set to be 2.0 nm or less.

Claim 5 (Original): The film formation method according to claim 1, wherein, in the first step, the nitrogen-containing reducing gas is set to have a partial pressure of 15 Pa or less within the process container.

Claim 6 (Original): The film formation method according to claim 1, wherein, in film formation, the target substrate is set at a temperature of 400°C or less.

Claim 7 (Original): A film formation method for forming a TiN film having a predetermined thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a Ti compound gas and a nitrogen-containing reducing gas to form a film of TiN by CVD, and the second step is arranged to stop the Ti compound gas and supply the nitrogen-containing reducing gas,

wherein, in film formation, the target substrate is set at a temperature of less than 450°C, the process container is set to have therein a total pressure of more than 100 Pa, and the nitrogen-containing reducing gas is set to have a partial pressure of 30 Pa or less within the process container in the first step.

Claim 8 (Original): The film formation method according to claim 7, wherein the Ti compound gas is  $TiCl_4$  and the nitrogen-containing reducing gas is  $NH_3$ .

Claim 9 (Original): The film formation method according to claim 7, wherein a film thickness obtained by the cycle performed once is set to be 0.50 nm or less.

Claim 10 (Original): The film formation method according to claim 7, wherein, in the first step, the nitrogen-containing reducing gas is set to have a partial pressure of 20 Pa or less within the process container.

Claim 11 (Original): The film formation method according to claim 10, wherein a film thickness obtained by the cycle performed once is set to be 2.0 nm or less.

Claim 12 (Original): The film formation method according to claim 7, wherein, in the first step, the nitrogen-containing reducing gas is set to have a partial pressure of 15 Pa or less within the process container.

Claim 13 (Original): The film formation method according to claim 7, wherein, in film formation, the target substrate is set at a temperature of 400°C or less.

Claim 14 (Original): The film formation method according to claim 7, wherein, in the first step, the nitrogen-containing reducing gas is set at a flow rate of 20 mL/min or more.

Claim 15 (Original): The film formation method according to claim 7, wherein, in the first step, the Ti compound gas is set to have a partial pressure of more than 10 Pa and not more than 50 Pa.

Claim 16 (Original): The film formation method according to claim 7, wherein the TiN film is set to have a resistivity of 800  $\mu\Omega\text{-cm}$  or less.

Claim 17 (Original): A film formation method for forming an initial metal nitride film having a first thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen-containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal compound gas and supply the nitrogen-containing reducing gas; and then forming thereon an additional metal nitride film having a second thickness by continuous CVD arranged to supply a metal compound gas and a nitrogen-containing reducing gas onto the target substrate,

wherein, in formation of the initial metal nitride film, the target substrate is set at a temperature of less than 450°C, the process container is set to have therein a total pressure of more than 100 Pa, and the nitrogen-containing reducing gas is set to have a partial pressure of 30 Pa or less within the process container in the first step.

Claim 18 (Original): The film formation method according to claim 17, wherein the first thickness is smaller than the second thickness.

Claims 19-20 (Canceled).

Claim 21 (Currently Amended): [[A]] The film formation method according to claim 17, for forming an initial metal nitride film having a first thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen-containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal

~~compound gas and supply the nitrogen-containing reducing gas; and then forming thereon an additional metal nitride film having a second thickness by performing a cycle comprising the first step and the second step at least once;~~

~~wherein, in formation of the initial metal nitride film, the target substrate is set at a temperature of less than 450°C, the process container is set to have therein a total pressure of more than 100 Pa, and the nitrogen-containing reducing gas is set to have a partial pressure of 30 Pa or less within the process container in the first step, and wherein, in formation of the additional metal nitride film, the nitrogen-containing reducing gas is set to have a partial pressure of more than 30 Pa within the process container in the first step.~~

Claims 22-23 (Canceled).

Claim 24 (Original): A film formation method for forming a metal nitride film having a predetermined thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen-containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal compound gas and supply the nitrogen-containing reducing gas,

wherein, in film formation, the target substrate is set at a temperature of less than 450°C, and the process container is set to have therein a total pressure of more than 100 Pa, and wherein the metal nitride film is set to have a resistivity  $R$  of  $800 \mu\Omega\text{-cm}$  or less calculated by a following formula (A);

$$R = 115.75 \times \ln(T_{hk}) + 71.576 \times \ln(P_N) + 418.8 \dots (A)$$

where  $P_N$  (Pa) denotes a partial pressure of the nitrogen-containing reducing gas within the process container in the first step, and  $T_{hk}$  (nm) denotes a film thickness obtained by the cycle performed once.

Claim 25 (Original): The film formation method according to claim 24, wherein the metal compound gas is a Ti compound gas and the metal nitride film is a TiN film.

Claim 26 (Original): The film formation method according to claim 25, wherein the Ti compound gas is  $TiCl_4$  and the nitrogen-containing reducing gas is  $NH_3$ .

Claim 27 (Currently Amended): [[A]] The film formation method according to claim 24, for forming a metal nitride film having a predetermined thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen-containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal compound gas and supply the nitrogen-containing reducing gas;

wherein, in film formation, the target substrate is set at a temperature of less than  $450^\circ C$ , and the process container is set to have therein a total pressure of more than 100 Pa, and wherein the metal nitride film is set to have a resistivity  $R$  of  $800 \mu\Omega\text{-cm}$  or less calculated by a following formula (B);

$$R = 115.75 \times \ln(T_{hk}) + 71.576 \times \ln(P_N) - 57.685 \times \ln(F_N) + 614 \dots (B)$$

where  $P_N$  (Pa) denotes a partial pressure of the nitrogen-containing reducing gas within the process container in the first step,  $T_{hk}$  (nm) denotes a film formation thickness obtained by

the cycle performed once, and  $F_N$  (mL/min) denotes a flow rate of the nitrogen-containing reducing gas in the first step.

Claims 28-29 (Canceled).

Claim 30 (Currently Amended): [[A]] The film formation method according to claim 24, for forming a metal nitride film having a predetermined thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal compound gas and supply the nitrogen containing reducing gas,

wherein, in film formation, the target substrate is set at a temperature of less than 450°C, and the process container is set to have therein a total pressure of more than 100 Pa, and wherein the metal nitride film is set to have a resistivity  $R$  of  $800 \mu\Omega\text{-cm}$  or less calculated by a following formula (C);

$$R = 115.75 \times \ln(T_{hk}) + 71.576 \times \ln(P_N) - 57.685 \times \ln(F_N) - 2844.6 \ln(T_W) + 17658.3$$

...(C)

where  $P_N$  (Pa) denotes a partial pressure of the nitrogen-containing reducing gas within the process container in the first step,  $T_{hk}$  (nm) denotes a film formation thickness obtained by the cycle performed once,  $F_N$  (mL/min) denotes a flow rate of the nitrogen-containing reducing gas in the first step, and  $T_W$  (°C) denotes temperature of the target substrate.

Claims 31-32 (Canceled).

Claim 33 (Original): A computer readable medium containing software for a computer to control a film formation apparatus, so as to form a metal nitride film having a predetermined thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen-containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal compound gas and supply the nitrogen-containing reducing gas, wherein, in film formation, the target substrate is set at a temperature of less than 450°C, the process container is set to have therein a total pressure of more than 100 Pa, and the nitrogen-containing reducing gas is set to have a partial pressure of 30 Pa or less within the process container in the first step.

Claim 34 (Canceled).

Claim 35 (Original): A computer readable medium containing software for a computer to control a film formation apparatus, so as to form a metal nitride film having a predetermined thickness on a target substrate by heating the target substrate at a film formation temperature within a process container and performing a cycle comprising a first step and a second step at least once, such that the first step is arranged to supply a metal compound gas and a nitrogen-containing reducing gas to form a film of a metal nitride by CVD, and the second step is arranged to stop the metal compound gas and supply the nitrogen-containing reducing gas, wherein, in film formation, the target substrate is set at a temperature of less than 450°C, and the process container is set to have therein a total pressure of more than 100 Pa, and wherein the metal nitride film is set to have a resistivity R of 800  $\mu\Omega$  -cm or less calculated by a following formula (A);

$$R = 115.75 \times \ln(T_{hk}) + 71.576 \times \ln(P_N) + 418.8 \dots (A)$$

where  $P_N$  (Pa) denotes a partial pressure of the nitrogen-containing reducing gas within the process container in the first step, and  $T_{hk}$  (nm) denotes a film thickness obtained by the cycle performed once.

Claim 36-40 (Canceled).